

Rolling Knolls Landfill Settling Parties

Addendum 1 to the Quality Assurance Project Plan for the Data Gaps Sampling and Analysis Plan

Rolling Knolls Landfill Superfund Site

Chatham, New Jersey

August 2015

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Quality Assurance Project Plan for the
Data Gaps Sampling and Analysis
Plan**

Rolling Knolls Landfill Superfund Site
Chatham, New Jersey

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2015 Quality Assurance Project Plan Addendum 1

This document serves as an Addendum to the Data Gaps Quality Assurance Project Plan (QAPP) for the Rolling Knolls Landfill Superfund Site (the site) located in Chatham, New Jersey (October 2014). This QAPP Addendum relates to the additional soil and sediment sampling required to complete the objectives originally identified in Section 1.1 of the Approved Data Gap Sampling and Analysis Plan (SAP) (November 2014) and to address additional delineation concerns identified by the U.S. Environmental Protection Agency (USEPA) and New Jersey Department of Environmental Protection (NJDEP) (letters dated June 17, 2015 and August 17, 2015) to further delineate the nature and extent of contamination at the site.

In addition, the Group is proposing additional sampling to that requested by USEPA and NJDEP. The purpose of these samples is to further delineate constituents of concern at the site. This addendum contains the sampling proposed by the USEPA, NJDEP, and the Group.

Information that was included in the approved December 2014 QAPP for the project should be followed, with the following additions to the worksheets specific to the additional delineation samples. The following worksheets have been revised:

Worksheet #14/16: Project Tasks & Schedule

Worksheet #17: Sampling Design and Rationale

Worksheet #18: Sampling Locations and Methods

Worksheet #20: Field QC Summary

QAPP Worksheet #14/16: Project Tasks & Schedule

| Activity | Responsible party | Planned start date | Planned completion date | Deliverable(s) | Deliverable due date |
|---|--------------------------|---------------------------|--------------------------------|--|-----------------------------|
| Mobilization | ARCADIS | 21 September 2015 | 21 September 2015 | Field notes | 21 September 2015 |
| Underground utility clearing | ARCADIS | 21 September 2015 | 21 September 2015 | Field notes of New Jersey One-Call utility mark outs | 21 September 2015 |
| Sample collection – soil and sediment | ARCADIS | 21 September 2015 | 16 October 2015 | Field notes, map of boring locations, and soil logs | 23 October 2015 |
| Analysis of soil and sediment samples | TestAmerica | 22 September 2015 | 16 November 2015 | Report of Analyses/Data package | 16 November 2015 |
| Validation of soil and sediment data | ARCADIS | 19 October 2015 | 11 December 2015 | Validation summary report | 18 December 2015 |
| Third groundwater sampling event (all new wells) | ARCADIS | 19 October 2015 | 28 October 2015 | Field notes and purge logs | 4 November 2015 |
| Groundwater sample analysis | TestAmerica | 20 October 2015 | 30 November 2015 | Laboratory data packages | 30 November 2015 |
| Validation of third groundwater sampling event data | ARCADIS | 17 November 2015 | 30 December 2015 | Validation summary report | 30 December 2015 |
| Usability assessment | Project Team | December 2015 | January 2016 | Meeting minutes/Usability assessment summary report | January 2016 |
| Final report | ARCADIS | 31 December 2015 | 5 February 2016 | Final report | 5 February 2016 |

Note: The tasks included in this worksheet represent the remaining activities for the Data Gaps SAP implementation. The text section of the approved QAPP Worksheet #14 & 16 are not changed in the context of this Addendum, hence it is not repeated here.

QAPP Worksheet #17: Sampling Design and Rationale

Physical boundaries for the area under study

- Figure 1 depicts the estimated boundaries of the landfill and surface debris area based on observations during test pit activities. Eastern and southern portions of the landfill are located within the Great Swamp National Wildlife Refuge (GSNWR).

Time period being represented by the collected data

- The additional delineation soil and sediment sampling is scheduled for September and October 2015. All data will represent current conditions.

Description of the sampling area

- The sampling areas were selected to address additional delineation concerns identified by USEPA, NJDEP, and the Group following collection of the soil and sediment samples during the initial Data Gaps SAP implementation (November 2014 through March 2015).
- The sampling areas include soil along the perimeter of the estimated landfill boundary (SS-165 through SS-176), soil located in the interior of the landfill (SS-177 through SS-183), sediment along the perimeter of the estimated landfill boundary (SD-45 through SD-50 and SD-52 through SD-68), and sediment in ponds near the landfill (SD-51 and SD-69).

Sample locations

- **Soil samples.** The proposed soil sampling locations are shown on Figures 2a and 2b.
 - a. Basis for the number and placement of samples: A total of 34 soil samples, with 4 additional samples (contingent on the results), will be collected. Soil sampling locations located off the boundary of the landfill in native soil (SS-165 through SS-176) are near where previous soil samples contained concentrations of one or more constituents of concern (COCs) exceeding its New Jersey Soil Remediation Standard (SRS) or in areas identified as potential depositional zones. Soil sampling locations located within the interior of the landfill (SS-177 through SS-183) were selected to define the vertical delineation within the landfill. The soil samples collected from locations SS-165 through SS-176 will be analyzed for semivolatile organic compounds (SVOCs) (including SVOCs by selective ion monitoring [SIM]), polychlorinated biphenyls (PCBs) as Aroclors, pesticides, target analyte list (TAL) metals, and cyanide. In addition, the sample collected from location SS-168 will also be analyzed for PCB congeners. The soil samples collected from locations SS-177 through SS-183 will be analyzed for full target compound list (TCL)/TAL (i.e., volatile organic compounds [VOCs], SVOCs, PCBs as Aroclors, pesticides, metals, and cyanide) and SVOCs by SIM.

- b. How sample positions will be located: Sample locations were selected in consultation with USEPA and NJDEP. They will be located using site landmarks (e.g, monitoring wells or other permanent features) and global positioning system (GPS). All proposed soil sampling locations will be surveyed to satisfy NJDEP requirements.
 - c. If a soil sample cannot be collected where planned, the sample location may be moved to another location within 10 feet of the proposed location. If a suitable location is not available within 10 feet of the proposed location, a field change request will be submitted to USEPA for approval prior to relocating the sample.
- **Sediment samples.** The proposed sediment sampling locations are shown on Figures 2a and 2b.
 - a. Basis for the number and placement of samples: A total of 24 sediment samples, with 1 additional sample (contingent on the results), will be collected. Sediment samples will be collected from surface water bodies near the landfill that were not sampled during the previous investigations, and along the perimeter of the estimated landfill boundary. The sediment samples collected from locations SD-45 through SS-60 and SD-63 through SD-69 will be analyzed for SVOCs (including SVOCs by SIM), PCBs as Aroclors, pesticides, TAL metals, cyanide, pH, total organic carbon (TOC), and grain size. The sediment samples collected from locations SD-61 and SD-62 will be analyzed for full TCL/TAL (i.e., VOCs, SVOCs, PCBs as Aroclors, pesticides, metals, and cyanide), SVOCs by SIM, pH, TOC, and grain size.
 - b. How sample positions will be located: Sample locations were selected in consultation with USEPA and NJDEP. They will be located using site landmarks (e.g, monitoring wells or other permanent features) and GPS. All proposed sediment sampling locations will be surveyed to satisfy NJDEP requirements.
 - c. If a sediment sample cannot be collected where planned, the sample location may be moved to another location within 10 feet of the proposed location. If a suitable location is not available within 10 feet of the proposed location, a field change request will be submitted to USEPA for approval prior to relocating the sample.

QAPP Worksheet #18: Sampling Locations and Methods

| Sample ID | Matrix | Depth (ft bgs) | Type | Analyte/Analytical Group | Sampling SOP | Comments |
|--|--------|--|-----------|--|--------------|-------------------|
| SS-165 SS-166 SS-167 SS-169 SS-170 SS-171 SS-172 SS-175 SS-176 | Soil | 0.0-1.0 and 1.0-2.0 | Macrocore | SVOCs, SVOCs-SIM, PCBs (as Aroclors), Pesticides, TAL Metals, Cyanide | SOP 5, 17 | |
| SS-168 | Soil | 0.0-1.0 and 1.0-2.0 | Macrocore | SVOCs, SVOCs-SIM, PCBs (as Aroclors), PCB congeners, Pesticides, TAL Metals, Cyanide | SOP 5, 17 | |
| SS-173 SS-174 | Soil | 0.0-1.0 and 1.0-2.0 | Macrocore | SVOCs, SVOCs-SIM, PCBs (as Aroclors), Pesticides, TAL Metals, Cyanide | SOP 5, 17 | Contingent Sample |
| SS-177 SS-178 SS-179 SS-180 SS-181 | Soil | TBD Note: Two samples will be collected from each location. | Macrocore | VOCs, SVOCs, SVOCs-SIM, Pesticides, PCBs (as Aroclors), TAL Metals, Cyanide | SOP 5, 17 | |

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| Sample ID | Matrix | Depth (ft bgs) | Type | Analyte/Analytical Group | Sampling SOP | Comments |
|-----------|----------|----------------|-------------|--|--------------|----------|
| SS-182 | | | | | | |
| SS-183 | | | | | | |
| SD-45 | Sediment | 0.0-1.0 | Grab sample | SVOCs, SVOCs-SIM, PCBs (as Aroclors), Pesticides, TAL Metals, Cyanide, pH, TOC, Grain Size | SOP 14 | |
| SD-46 | | | | | | |
| SD-47 | | | | | | |
| SD-48 | | | | | | |
| SD-49 | | | | | | |
| SD-51 | | | | | | |
| SD-52 | | | | | | |
| SD-53 | | | | | | |
| SD-54 | | | | | | |
| SD-55 | | | | | | |
| SD-56 | | | | | | |
| SD-57 | | | | | | |
| SD-58 | | | | | | |
| SD-59 | | | | | | |
| SD-60 | | | | | | |
| SD-63 | | | | | | |
| SD-64 | | | | | | |
| SD-65 | | | | | | |
| SD-66 | | | | | | |
| SD-67 | | | | | | |
| SD-68 | | | | | | |

| Sample ID | Matrix | Depth (ft bgs) | Type | Analyte/Analytical Group | Sampling SOP | Comments |
|----------------|----------|----------------|-------------|--|--------------|-------------------|
| SD-69 | | | | | | |
| SD-50 | Sediment | 0.0-1.0 | Grab sample | SVOCs, SVOCs-SIM, PCBs (as Aroclors), Pesticides, TAL Metals, Cyanide, pH, TOC, Grain Size | SOP 14 | Contingent Sample |
| SD-61 SD-62 | Sediment | 0.0-1.0 | Grab sample | VOCs, SVOCs, SVOCs-SIM, PCBs (as Aroclors), Pesticides, TAL Metals, Cyanide, pH, TOC, Grain Size | SOP 14 | |

Abbreviations:

ft bgs – feet below ground surface

PCBs – polychlorinated biphenyls

SOP – standard operating procedure

SVOC – semivolatile organic compounds

SVOC-SIM – semivolatile organic compounds by selective ion monitoring

TAL – target analyte list

TBD – to be determined; sample depth is contingent on the depth of landfilled material observed in the boring and the depth of the clay layer. One sample will be collected immediately beneath the landfilled material and one sample will be collected immediately above the clay.

TOC – total organic carbon

VOC – volatile organic compounds

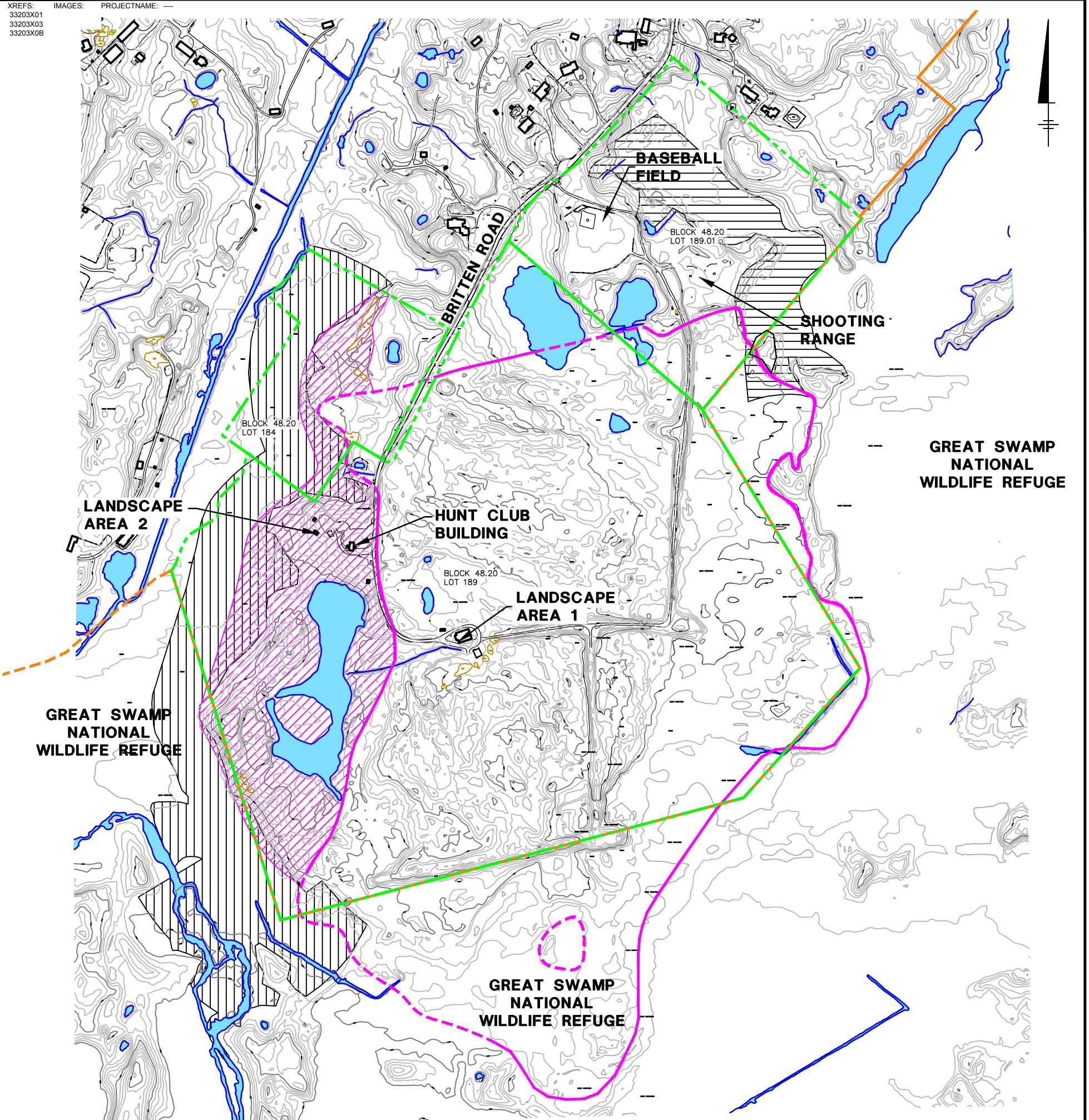
SOPs are available in the QAPP (ARCADIS; December 2014).

QAPP Worksheet #20: Field QC Summary

| Matrix | Analyte/Analytical Group | Test Method / SOP | Field Samples | Field Duplicates | Matrix Spikes | Matrix Spike Duplicates | Equipment Blanks | Trip Blanks | Total # analyses |
|---------------|---------------------------------|-----------------------------|----------------------|-------------------------|----------------------|--------------------------------|-------------------------|--------------------|-------------------------|
| Soil | VOCs | SOM01.2/TAB-4 | 14 | 1 | 1 | 1 | 1 | 1 | 19 |
| Soil | SVOCs | SOM01.2/TAB-3 | 38 | 2 | 1 | 1 | 2 | 0 | 44 |
| Soil | SVOCs-SIM | SOM01.2-SIM/TAB-3 | 38 | 2 | 1 | 1 | 2 | 0 | 44 |
| Soil | PCBs (as Aroclors) | SOM01.2/TAB-1 | 38 | 2 | 1 | 1 | 2 | 0 | 44 |
| Soil | Pesticides | SOM01.2/TAB-2 | 38 | 2 | 1 | 1 | 2 | 0 | 44 |
| Soil | TAL Metals, Mercury, Cyanide | ISM01.3/TAB-5, TAB-6, TAB-7 | 38 | 2 | 1 | 1 | 2 | 0 | 44 |
| Soil | PCB Congeners | EPA 1668/ TAWS-1 | 2 | 0 | 0 | 0 | 1 | 0 | 3 |
| Sediment | VOCs | SOM01.2/TAB-4, TAB-11 | 2 | 1 | 1 | 1 | 1 | 1 | 7 |
| Sediment | SVOCs | SOM01.2/TAB-3 | 25 | 2 | 1 | 1 | 1 | 0 | 30 |
| Sediment | SVOCs SIM | SOM01.2-SIM/TAB-3 | 25 | 2 | 1 | 1 | 1 | 0 | 30 |
| Sediment | PCBs (as Aroclors) | SOM01.2/TAB-1 | 25 | 2 | 1 | 1 | 1 | 0 | 30 |
| Sediment | Pesticides | SOM01.2/TAB-2 | 25 | 2 | 1 | 1 | 1 | 0 | 30 |
| Sediment | TAL Metals, Mercury and Cyanide | ISM01.3/TAB-5, TAB-6, TAB-7 | 25 | 2 | 1 | 1 | 1 | 0 | 30 |
| Sediment | pH, TOC, grain size | Lloyd Kahn/TAB-9 | 25 | 2 | 1 | 1 | 0 | 0 | 29 |

Abbreviations:

PCBs – polychlorinated biphenyls
SOP – standard operating procedure
SVOC – semivolatile organic compounds
SVOC-SIM – semivolatile organic compounds by selective ion monitoring
TAL – target analyte list
TOC – total organic carbon
VOC – volatile organic compounds



LEGEND:

- OPEN WATER
- EDGE OF LANDFILLED WASTES OBSERVED DURING TEST PIT ACTIVITIES (DASHED WHERE APPROXIMATE)
- GREAT SWAMP NATIONAL WILDLIFE REFUGE PROPERTY BOUNDARY (DASHED WHERE APPROXIMATE)
- TAX PARCELS
- WASTE AND DEBRIS OBSERVED ON GROUND SURFACE BUT NOT OBSERVED OR ANTICIPATED TO BE BELOW GROUND SURFACE
- POTENTIAL BOG TURTLE HABITAT AREA A (35.31 ACRES)
- POTENTIAL BOG TURTLE HABITAT AREA B (10.89 ACRES)

NOTES:

1. THE PRE-REMEDIATION INVESTIGATION PROJECTED EDGE OF LANDFILLED MATERIALS ON THIS FIGURE IS APPROXIMATE AS DRAWN AND IS BASED ON VISUAL OBSERVATIONS OF THE GROUND SURFACE MADE DURING SITE VISITS CONDUCTED JUNE 20, 2006 THROUGH JULY 14, 2006.
2. THE EDGE OF LANDFILLED WASTES OBSERVED DURING TEST PIT ACTIVITIES IS DRAWN BASED ON OBSERVATIONS OF MATERIALS EXCAVATED DURING TEST PIT ACTIVITIES CONDUCTED FROM JULY 26, 2007 TO SEPTEMBER 6, 2007 AND MARCH 26, 2008.
3. THE PORTION OF THE GREAT SWAMP NATIONAL WILDLIFE REFUGE (GSNWR) PROPERTY BOUNDARY ON THIS FIGURE WITHIN CHATHAM TOWNSHIP, NJ WAS OBTAINED FROM CHATHAM TOWNSHIP TAX PARCEL DATA PROVIDED BY CIVIL SOLUTIONS. THE PORTION OF THE GSNWR PROPERTY BOUNDARY ON THIS FIGURE OUTSIDE OF CHATHAM TOWNSHIP IS APPROXIMATE AND WAS OBTAINED FROM THE UNITED STATES FISH AND WILDLIFE SERVICE (GEOGRAPHIC INFORMATION SYSTEMS AND SPATIAL DATA).
4. BLOCK 48.20, LOTS 184 AND 189 ARE OWNED BY ROBERT J. MIELE AS TRUSTEE FOR THE TRUST CREATED BY THE LAST WILL AND TESTAMENT OF ANGELO J. MIELE. BLOCK 48.20, LOT 189.01 IS OWNED BY THE GREEN VILLAGE FIRE DEPARTMENT.

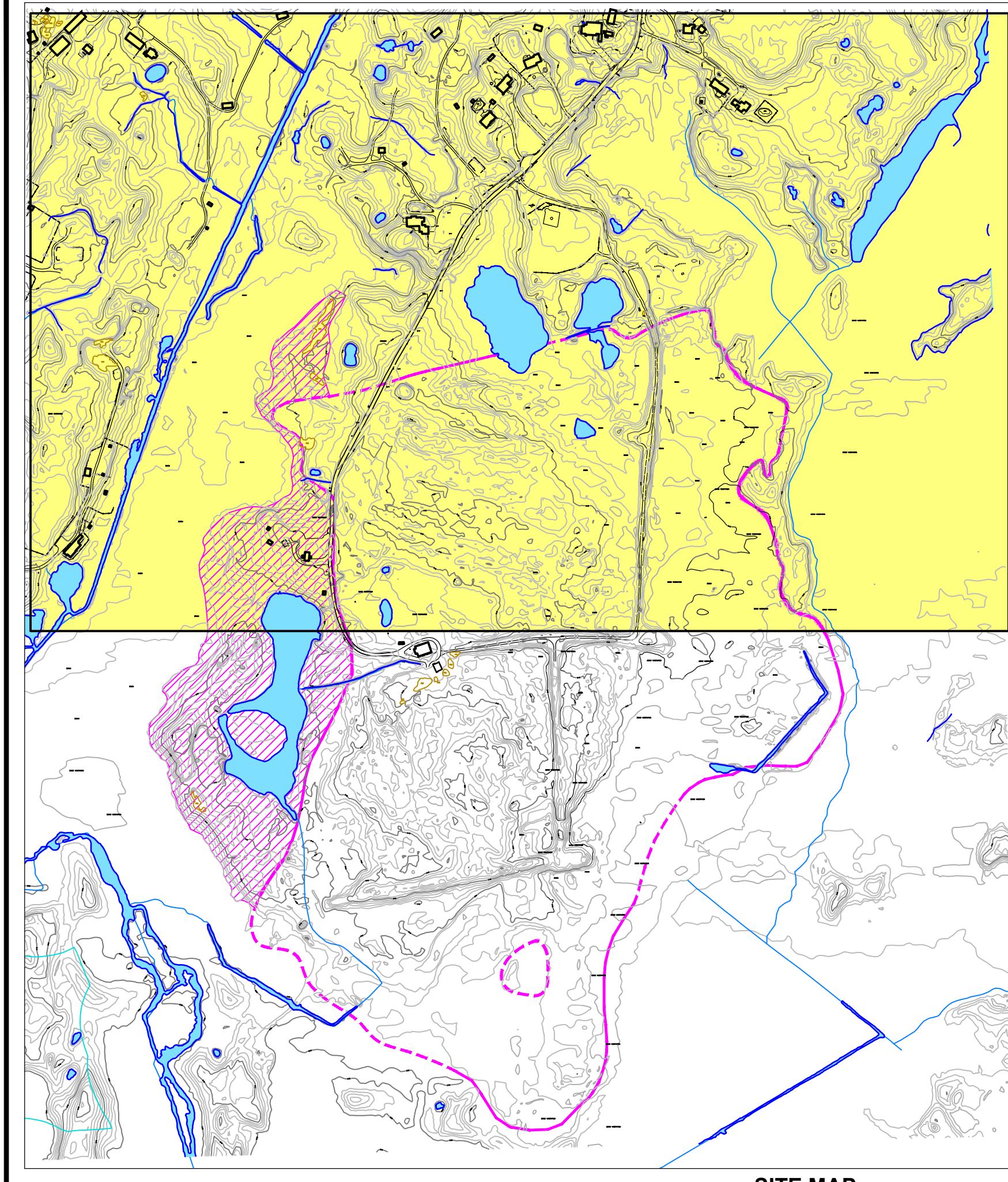
ROLLING KNOLLS LANDFILL SUPERFUND SITE CHATHAM, NEW JERSEY **QUALITY ASSURANCE PROJECT PLAN**

SITE PLAN

SOURCES:

1. BASEMAP FROM JAMES M. STEWART INC., LAND SURVEYORS, PHILADELPHIA, PA., (ELECTRONIC FILE: 292406.DWG DATED: 6/30/06)
2. TAX PARCEL DATA FOR CHATHAM TOWNSHIP WAS PROVIDED BY CIVIL SOLUTIONS.

0 500' 1000'
 GRAPHIC SCALE



SITE MAP

GRAPHIC SCALE

0 300' 1000'

LOANTAKA BROOK



OPEN WATER



EDGES OF LANDFILLED WASTES OBSERVED DURING TEST PIT ACTIVITIES (DASHED WHERE APPROXIMATE)



GREAT SWAMP NATIONAL WILDLIFE REFUGE PROPERTY BOUNDARY (DASHED WHERE APPROXIMATE)



WASTE AND DEBRIS OBSERVED ON GROUND SURFACE BUT NOT OBSERVED OR ANTICIPATED TO BE BELOW GROUND SURFACE



AREAS WHERE SURFACE WATER FLOW DOES NOT EXHIBIT TYPICAL BED AND BANK MORPHOLOGY



DATA GAP SAMPLING LOCATION



SAMPLES COLLECTED PRIOR TO DATA GAP SAMPLING



SOIL SAMPLING LOCATION



CONCENTRATIONS GREATER THAN NJDEP NONRESIDENTIAL SOIL REMEDIATION STANDARDS



PROPOSED MONITORING WELL



EXISTING MONITORING WELL



DATA GAP TEMPORARY WELL POINT



DATA GAP SOIL SAMPLE LOCATION



PROPOSED SOIL SAMPLE LOCATION



PROPOSED SEDIMENT/SOIL SAMPLE (SAMPLE TYPE WILL BE BASED ON FIELD CONDITIONS OBSERVED AT THE TIME OF SAMPLE COLLECTION)



STREAM GAUGE



DATA GAP STREAM GAUGE LOCATION



GROUNDWATER ELEVATION CONTOUR - DECEMBER 2014 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - NOVEMBER 2009 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - DECEMBER 2009 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - NOVEMBER 2008 (DASHED WHERE INFERRED)



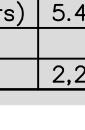
GROUNDWATER ELEVATION CONTOUR - DECEMBER 2008 (DASHED WHERE INFERRED)



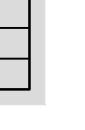
GROUNDWATER ELEVATION CONTOUR - NOVEMBER 2007 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - DECEMBER 2007 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - NOVEMBER 2006 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - DECEMBER 2006 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - NOVEMBER 2005 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - DECEMBER 2005 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - NOVEMBER 2004 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - DECEMBER 2004 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - NOVEMBER 2003 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - DECEMBER 2003 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - NOVEMBER 2002 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - DECEMBER 2002 (DASHED WHERE INFERRED)



GROUNDWATER ELEVATION CONTOUR - NOVEMBER 2001 (DASHED WHERE INFERRED)

GROUNDWATER ELEVATION CONTOUR - DECEMBER 2001 (DASHED WHERE INFERRED)

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GROUNDWATER ELEVATION CONTOUR - DECEMBER 1987 (DASHED WHERE INFERRED)




FIGURE 2b